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SCENE IN BRABANT.  
FROM THE PICTURE BY RUBENS IN THE NATIONAL GALLERY.

## RUBENS AND HIS WORKS.

## III.

In the year 1631 Rubens formed a second matrimonial alliance: his bride was Helena Forman, a young lady belonging to one of the richest and most respectable families in Antwerp. Her beauty, modesty, and amiable qualities have been celebrated by every writer of that day. She frequently served her husband as a model, and her portrait is found in many of his historical pictures. The same year he accepted the office of director of the School of Art in Antwerp, and in compliance with an ancient custom, presented the Academy with a chair covered in morocco leather, on the back of which was inscribed "Petrus Paulus Rubens, 1631," and which is still carefully preserved in the academy. He also gave an inauguration picture, the subject of which was the Virgin, with the infant Jesus and Joseph.

The reputation of Rubens as a painter was now becoming more and more widely diffused, so that the princes and nobles of Europe were anxious to obtain some of his works, and as the orders he received were far too numerous to admit of his executing them with his own hands, he was usually satisfied with furnishing the sketches, leaving the greater part of the working to his pupils, and then putting the finishing touches to the whole. "We must admit that pictures, in which the figures were painted by such artists as Van Dyck, Soutman, Van Heck, Diepenbeck, and Van Thulden; the landscapes by Wildens or Van Uden; the animals and other accessories by Snyders, may be regarded as successful, and for the most part excellent performances; but it was impossible that they could display such consistency, and individuality in conception and execution, as those which emanated from the pencil of Rubens alone."

It is to the co-operation of such pupils that Rubens was able to finish his large altar-pieces in such very short periods of time. He painted the celebrated altar-piece for the church of St. Roch, in Alost, in eight days, representing that saint healing the sick of the plague. On such occasions it was frequently arranged that for every day employed upon a picture, he should receive one hundred florins, equal to about ten pounds sterling.

His domestic tranquillity and occupations as an artist were interrupted in the year 1633, by another diplomatic mission, in consequence of hostilities between Flanders and Holland. After receiving his instructions from the minister, the Marquis Aytons, he went to Holland to endeavour to arrange a truce, in order, as it is said, to gain time to receive succours from Spain. With his customary precaution to conceal the object of his mission, Rubens arrived at the Hague, by a circuitous route, in the disguise of an ordinary traveller. He soon contrived to open a negotiation with the leaders of the council, and had made considerable advances in the object of his mission, when the sudden death of Prince Maurice of Orange terminated the treaty. Soon afterwards, when fears were excited at the court of Brussels by the military successes of the Dutch, Rubens was again sent to Holland, and he succeeded in inducing the States General to enter into a regular treaty of peace with the plenipotentiaries of Spain. Scarcely had he returned to his family, and resumed his occupations, when he received the painful intelligence of the death of the Infanta Clara Eugenia Isabella, his oldest and most esteemed patroness.

About the year 1635 Rubens became subject to frequent fits of gout, which, attacking his hands, disabled him from painting large pictures; he employed himself therefore chiefly on easel pictures, and landscapes were generally the subjects of his choice: many of these he finished at his country residence, Stein, near Mechlin. He also withdrew from business, and ceased to correspond with persons at a distance; yet the interest

which he took in art and science still survived in all its former enthusiasm, as appears by his letters of this period, and by the intercourse which he still kept up with artists and men of learning.

But although under the influence of ill health and declining years, new employments and new honours awaited him. The Cardinal Infant Don Ferdinand, brother to Philip IV. of Spain, had succeeded Isabella as Regent of the Netherlands, and was to enter the city of Antwerp in state, in the month of May, 1635. The authorities, wishing to give due splendour and interest to the ceremony, applied to Rubens to make the necessary plans, and compose the decorations for eleven triumphal arches, setting forth, in a series of allegorical pictures, the virtues and heroic actions of the new governor. The numerous sketches and studies made by the artist for this work, and the completion of the immense pictures under his direction, and in many instances finished with his own hand, "exhibit," as Mrs. Jameson remarks, "all the fire and spirit of an unimpaired fancy." On the day of the public entry, the artist was prevented by a fit of the gout from explaining his pictures to the regent, but he was indemnified for the disappointment by a visit from the prince, who remained with him a considerable time, engaged in conversation with the artist, and examining the rich collection of works of art with which Rubens had adorned his mansion.

In the year 1640 Rubens, then in the sixty-third year of his age, fell a victim to the frequent attacks of gout which had embittered his latter years. His funeral was conducted with much solemnity. The procession included the clergy of the collegiate church of St. Jacques, and several orders of the poor, to whose comfort he was a liberal contributor. On each side of the bier were sixty orphan boys, bearing torches; then followed the chief officers of the city, many noblemen, merchants, and citizens of Antwerp, and the members of the Academy of Painting. The body was placed in the family chapel in the church of St. Jacques, the altar of which was adorned by one of his most admirable works, representing the Virgin and the infant Jesus, with the adoration of St. Bonaventura. This picture contains, besides, the portraits of three females, (two of them being his own wives) and that of the artist himself, who is represented as St. George; in the foreground are St. Jerome and the lion. "This picture," says Waagen, "is singularly attractive, from the energy and life in the figures, and the splendour of the colouring."

The family having expressed a wish to that effect, the artist's friend Gevaerts wrote a Latin epitaph, in which the merits of Rubens as a man of learning, a painter, and a statesman are commemorated; but it is stated that the plain slab on which this inscription is engraved was not really put up till a century after the death of Rubens. It is difficult to explain this mark of disrespect, for the chapel and monument were erected to his memory by his widow and children.

The catalogue of the works of art in the possession of Rubens at the time of his death contained three hundred and nineteen pictures alone, although the artist's widow had previously made a selection of such as pleased her most, or those which she thought likely to injure the artist's reputation. It was at first intended to sell the whole collection by auction; but this was abandoned, and the pictures, having been valued by eminent artists, were sold separately by private contract. The principal purchasers were the King of Spain, the Emperor, the King of Poland, the Elector of Bavaria, and Cardinal Richelieu, the latter of whom obtained a great part of the most valuable works. The valuable collection of gems and cameos, medals and carvings, were bought altogether by the King of Spain.

The person of Rubens will be familiar to most of our readers from the many excellent engravings from such of the artist's pictures as portray his outward form.

We call to mind the features of this artist as naturally as those of a familiar friend. Who does not remember that oval face, those finely-formed and regular features, the dark hazel eyes, and the curling auburn hair? Those who have seen the family-piece at Blenheim will not fail to agree with the remark of Waagen:

That even in his later days Rubens could relinquish that fervid redundancy of style for which he had become remarkable, and lend to his conceptions all the softer graces of the affections, to his execution the most finished care, to his colouring all the modesty of nature, is proved by a picture at Blenheim, representing himself and his second wife, Helena Forman, strolling in a flower garden: she is conducting a child in leading-strings. This representation of the innocent domestic happiness enjoyed by a person of noble character, mature age, and distinguished station, strikes the beholder so vividly, that it is sure to produce the most agreeable and soothing impressions on the mind, and I have no hesitation in pronouncing it one of the most successful family-pieces in the world.

We have already referred to the graceful and attractive manners of Rubens;—his conversation has been characterized as facile and engaging; and when animated in discourse his eloquence, delivered with a full and clear intonation of voice, was always powerful and persuasive. He would converse freely with his visitors and at the same time pursue the operations of the pencil, or attend to the reading of some classical author, a practice of which he was very fond. His habits were to rise early, attend the service of the church, and afterwards engage in sketching or drawing; after breakfast he entered his painting-room, examined the progress of his scholars, corrected their works, and directed their further proceedings. His lessons, conveyed with clearness, were illustrated by such excellent examples that his pupils soon became capable of forwarding all his large works. In the evening he frequently rode on horseback, or walked on the ramparts of the city. He seldom visited, but was always happy to receive those who came to his house. The supper time was generally cheered by the society of some friends, chiefly of learned men or eminent painters; among the former were Nicholas Rockox, the burgomaster of the city, and Gaspard Gevartius.

But nothing inspires such a favourable idea of the disposition and general structure of the mind of Rubens as his conduct towards other artists—conduct the more worthy of admiration as he himself, owing to his great talents, wealth, and distinguished connexions, occupied a station in society at once honourable and important. His doors were open at all hours, even when he was at work, to every artist desirous of profiting by his aid or advice; and he was ever ready to inspect the works of any artist who wished it. On such occasions he always gave his opinion with candour according to the principles of the art; nay, he would even take up the brush himself, and touch such parts as required it. In almost every picture he was sure to discover something good, and it seemed to afford him real pleasure to acknowledge the merits of a brother artist, and to set them forth on every opportunity. Upon being told that Van Dyck, after his return from Italy, complained that the profits from his works were not sufficient for his maintenance, he went the very next day to him, and purchased all the pictures which he found in a finished state. The manner in which he conducted himself towards his enemies, and those who were envious of his brilliant reputation, was as wise as it was generous. The insinuations of the painter Rombouts, who did all in his power to detract from his merits, he refuted by his famous work, the Descent from the Cross, in the Cathedral of Antwerp. To Abraham Janssens, who challenged him for a wager to paint a picture with him, and submit their rival pretensions to the decision of the public, he replied that this was quite unnecessary, as he had long submitted his works to the judgment of the whole world, and he advised him to follow his example. The slanderous detractions of Cornelius Schut

he requited in another manner. He paid him a visit, praised his pictures, and inquiring their prices, declared he would buy them himself for the sums named: further, he assured him that in case he should ever be without employment he might always reckon on his assistance. And when his enemies had spread the report abroad that he employed Snyders, Van Uden, and Wildens, because he was himself incompetent to paint animals and landscapes, he replied to the imputation by executing with his own hand four landscapes and two lion-hunts, in such a manner as to silence the most envious. In further confirmation of Rubens' good sense and practical turn of mind, the following anecdote may be cited. While engaged in the profitable task of illustrating the important events in the life of Marie de Medicis, in a series of twenty-one pictures, a painter named Brendel, whose mind was affected by the pursuit of alchemy, proposed to Rubens to associate with him in search of the philosopher's stone, assuring him that he was on the eve of discovering it, and offering to divide with him the expected gains if he would advance a sum sufficient to prepare the laboratory and the necessary materials. Rubens, after listening to him with patience, replied "Master Brendel, you have come just twenty years too late, for so long is it since I first discovered the true philosopher's stone in my palette and pencils."

The large landscape in the National Gallery, an idea of which may be conveyed by our frontispiece, "shows, as in a magic mirror, the beautiful and fertile Brabant in its luxuriant verdure, illumined by the morning sun. Every thing that art can effect by single trees, by shadows of clouds, to produce variety in an extensive level surface is done here, and the execution so minute that the trees are animated by singing birds: the landscape is likewise enlivened by numerous figures of men and animals."—WAAGEN\*.

\* We cannot take leave of the name of this eminent connoisseur without expressing our obligations to his skilful essay on the life and writings of Rubens. It has recently been translated by Mr. Noel in the spirit of the original, and Mrs. Jameson has edited it in her usual agreeable manner.

## THE COCHINEAL INSECT,

(*Coccus cacti*.)

THE remarkable insect whose history and habits we are about to lay before our readers belongs to a family which is placed by naturalists in the order *Hemiptera*. This order receives its name from the circumstance that a great number of the insects which compose it have wings partly horny, and partly consisting of membrane, and moreover terminating very abruptly, hemiptera signifying "half wing." Although the cochineal insect differs from the larger proportion of insects in this order, by having, in the case of the male, two membranaceous wings, and in that of the female none at all, yet its relation to them in other respects, such as the conformation of the mouth, and the manner in which it takes its food, is so perfect that it is not considered desirable to separate it from the order on that account.

The cochineal insects are all very small and delicate, and singularly remarkable for the difference of form in the sexes. The body of the male is much smaller than that of the female, but it is provided with two large wings, which make the difference in size less apparent. These wings are placed horizontally, and are covered with remarkably fine nervures. The antennæ of the male insect are also long, with eleven distinct articulations: the head is round, the eyes small. The body of the female is oval-shaped, without wings, flat; the antennæ short, with articulations very little distinct. The mouth consists of a small conical bill and sucker, by means of which the insect feeds on the juices of vegetables.

In the early stage of their existence, the male and female cochineals are scarcely to be distinguished from

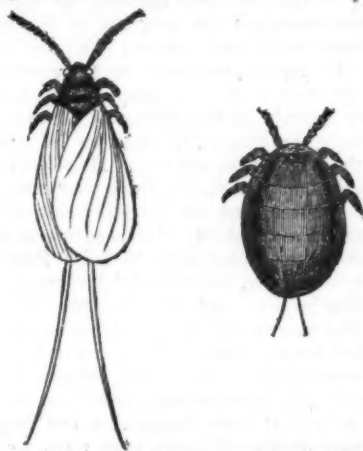


each other. They are said to have the appearance of tiny red tortoises, and to be very active in feeding upon stems and leaves, which they pierce by means of their sharp beaks even to the very centre of the shoot, causing the sap to flow in abundance, and doing much injury to the plant. Some of the species are great pests in our hot-houses and green-houses on this account. During this, the more active period of their existence, the insects continue to increase in size, but the period soon arrives when the sexes undergo that singular difference of transformation above alluded to. All the insects affix themselves securely to the surface of plants or stems, and after a short time the male insect appears in his new and elegant form of a fly, while the female only changes her skin and remains fixed to the bark, becoming in appearance more and more assimilated to it. Indeed, so near is the resemblance to a gall, in individuals of this sex, that they are often mistaken for such, and have obtained in consequence the appellation of *gall insects*. They are usually found near the insertion of the stems in plants, and resemble little convex masses more or less oval, in which it is impossible to distinguish, even with the microscope, either head or feet, but merely the segments of the body. This is at the period when they are about to lay their eggs, and the circumstances connected with this process are very curious, and unlike what takes place in other insects. The eggs are very numerous, and as fast as they are laid the mother accumulates them beneath her body, which gradually dwindles in size until it becomes a mere pellicle, or thin membrane, inclosing the brood. The mother then dies, but her dried body still remains, and forms a sort of shell or cocoon, for the protection of her offspring. When the young ones are hatched they soon make their way from beneath their scaly covering, and commence those ravages, which, on account of the vast number of the insects, are so formidable as to lead to various plans for getting rid of the annoyance. The plants more particularly infested by these insects are, orange-trees, fig-trees, and olives; though some of the species are common on our vines, and hot-house plants. The chief interest attaching to the cochineal insects arises from their commercial importance as an article of importation, and from their value to our manufactures as yielding a rich and beautiful scarlet dye. Two of the species only are used in the arts, and for these we are indebted to the New World. The finer kind is known as the *Metèque*, because it is gathered at Metèque, in the province of Honduras; the other is called *woodland* or *wild cochineal*.

The plant on which the fine cochineal is reared in Mexico is the *Cactus opuntia*, or *Opuntia Hernandezii*. It is a large shrub, the berries of which are eaten by the Indians of Mexico, as are the berries of the majority of the cactus tribe, as well as the germs of the flowers. The flowers of the cactus *opuntia* are small and of a deep red colour, and it is to the juices of the plant that the colour of the cochineal is attributed. The Indian name of this cactus is *nopal*, and the plantations formed of it, for the sake of rearing the cochineal, are called *nopaleries*. The culture of the nopals consists merely of weeding out injurious herbs that might interfere with the growth of the plants, so that one man is able to keep a plantation in proper order, the most considerable of these plantations not being more than two acres in extent.

On the return of the fine season in Mexico, which happens about the middle of October, the female cochineals of the last brood, which have been preserved on branches of the cactus, within doors, by the Indians, during the rains, are placed in the nopaleries in the following manner. Eight or ten female insects, which have already some young ones, are put into a little nest, made of flax or cotton: this nest is attached to the thorns with which the leaves of the cactus are armed, and the bottom of the nest is directed towards the sun,

that the little family may be the sooner disclosed. The young cochineals issue from these nests in great numbers, for each female produces some thousands, which are at first no larger than the point of a pin, of a red colour, and covered with white dust. The young cochineals soon spread themselves over the leaves of the plant on which they were hatched, and attach themselves to it altogether. If they are torn from the leaves after they have become fixed, the proboscis breaks with which they take in their nourishment, and the insects perish in consequence. They remain only ten days in the larva form, and then become perfect insects. The females live about two months, and the males only half that time. According to M. Thierry de Menonville, there are six generations of these insects in the year, and if it were not for the casualties they are liable to, they might all be gathered. But it appears that the number of crops actually gathered every year is three, the first being taken towards the middle of December, and the last in the month of May. The first consists of those insects which have laid their eggs and are dead: these are less valuable than the rest, and lose much of their weight in drying. The second and third gatherings consist of the cochineals that have just begun to produce their young. In detaching these from the leaves, a knife is used, the edge and point of which are blunted, and this is carefully passed between the leaf and the insect, that the plant may not receive injury. This process causes the cochineals to quit their hold, and fall off into a vessel which is placed to receive them.



MALE AND FEMALE COCHINEAL INSECTS (MAGNIFIED.)

The Indians have different methods of depriving the cochineal insects of life, and on these methods depend principally the different colours of those which are brought to Europe. Some Indians put the insects into a basket, and plunge them into boiling water, afterwards exposing them to the sun to dry. Others put them into a hot oven, or on chafing-dishes, but the boiling water appears to be most efficacious. The insects, while alive, are covered with a white powder, which the hot water partially removes, making them to appear of a reddish-brown colour: in this state they are called *renagrida*. Those which are destroyed by the heat of an oven do not lose this powder, but remain of an ashen gray: they are called *jarpeada*. Some die upon the plants, and assume a blackish hue: these are called *negra*. The cochineals that have been taken alive from the plants lose two-thirds of their weight in drying, but the dead insects taken from the nests lose three-fourths. The cochineals being once dried may be kept in wooden coffers for an indefinite length of time, without sustaining any injury, or losing a particle of their tinctorial property.

Such is the history and management of the fine or cultivated cochineal, called by the Spanish name

*grana fina*, first discovered in Mexico in 1518, and long taken by Europeans for a seed. The wild cochineal lives in the woods, and feeds on a thorny cactus, from which the most skilful workmen cannot gather a sufficient quantity daily to remunerate them for their trouble, but it is found that when the wild cochineal is cultivated on the nopal of the gardens it is more easily separated from the plant than the fine sort, and on this account it is cultivated by the growers, though decidedly inferior to the *grana fina*. The wild cochineal is smaller than the other, and is covered with a cottony down, which increases its bulk with a matter useless in dyeing: it yields therefore in equal weight, much less colour, and is of inferior price to that of the fine cochineal.

In a future article we shall describe a few other species of the cochineal family, together with the uses to which these insects are applied; but we may here state, the French colonists of Algiers have undertaken the cultivation of the cochineal with great success. There have been three generations of the insect in the course of a year and a half, and in a very short period a thousand square feet of cactus will be inhabited by this precious insect, so that it may be fairly said to be acclimated in that part of the world.

### THE MECHANISM OF A FEATHER.

It has been remarked that if a mechanic had never seen nor heard of any other animals than quadrupeds, he would not have believed it possible that a creature of great weight could have been constructed to fly through the air, and rest on it with as much security as those walk and rest upon the ground; still less would he have suggested the means.

Yet, notwithstanding the difficulties which appear to encompass the subject, how easily and how admirably have they been overruled by the working of the Almighty Power! The general construction for this purpose consists in the conversion of the fore extremities into wings, the enlargement of the breast-bone with its powerful muscles, the extent of the lungs, the hollowiness of the bones, and the levity, compact arrangement, and strength of the feathers. It is to this last particular that we would direct the attention of our readers, as presenting much that is worthy of notice and admiration.

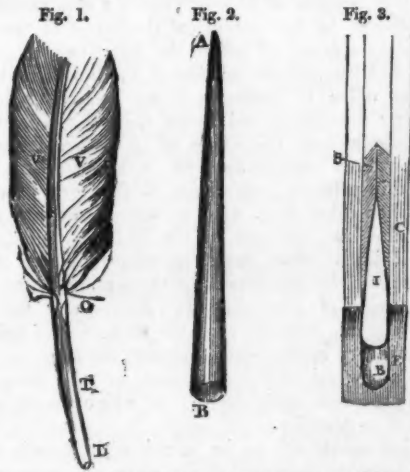
The structure of feathers is calculated in a high degree to combine the qualities of lightness and strength. The stem of the quill is made of horny materials which are tough, pliant and elastic, and disposed in the most advantageous manner for resisting flexion by being formed in a hollow cylinder. The vane of the feather is composed of a number of flat threads, or filaments, so arranged as to oppose much greater resistance to a force striking perpendicularly against their surface than to one which is directed laterally. On examining these filaments attentively, we find that they appear to adhere to one another, and yet there is no glutinous matter to cause this adhesion. The microscope enables us to discover the cause, and reveals to us a number of minute fibrils, arranged along the margin of the laminae, and calculated to catch upon and clasp one another when brought within a certain distance.

To render the construction of a feather as plain as possible to our readers, we must describe its first formation, and subsequent progress and structure; our knowledge of which has been so much advanced by the researches of M. Frederick Cuvier.

The first downy covering of a young bird consists of minute filaments collected in tufts of ten or twelve each. These tufts grow from the upper end of bulbous roots implanted in the skin, beneath which the apparatus for the formation of the feathers is gradually being constructed. The downy covering soon falls off, and then we begin to notice a number of minute cones, which in a few days

become elongated into cylinders with pointed extremities. Within these cylinders the wondrous work is going on, which ends in the development of the perfect feather. The materials of the future feather begin to be formed at the pointed extremity of the cylinder, and are successively deposited and fashioned into their proper shapes, and so extensive is the system of operations that it has been likened in its various stages to the proceedings in a large manufactory.

By examining a common feather we shall see that the posterior surface of the solid part of the stem, *s*, (fig. 1.) is divided into two parts by a longitudinal groove, from either side of which proceed a series of laminae, which with their fibrils compose what is called the vane of the feather. The lines from which the laminae arise approach one another at the lower part of the stem, and meet at a point where the solid part of the quill terminates, and where the transparent tubular part *r* begins. This point, *o*, has a small orifice leading to the interior of the quill, and at the lower extremity, *l*, is another orifice. Now, respecting the order in which this feather is formed, as discovered by the elaborate investigations of M. F. Cuvier, the following is an abridged account. Fig. 2, represents the cylinder or matrix in which the feather is formed. *A* is the apex or conical part, *B* the base, by which it is attached to the skin. A white line is seen running longitudinally the whole length of the cylinder, and a corresponding one is seen on the opposite side. These represent the situation of the front and the back part of the stem of the future feather. When the cylinder is laid open horizontally, (fig. 3,) it is found to be composed of a sheath or capsule, and of a central pulpy mass, termed the bulb. The capsule consists of several membranous layers (*c*, *e*, *s*, *i*), which are more consolidated near the apex, but gradually become softer and more delicate towards the base, where their formation is only beginning to take place.



The vane of the feather is the part which is first formed, and the construction of the laminae and fibrils of which it is composed is effected in the space between the outer capsule, *c*, and the central bulb, *B*, in a manner which is exceedingly remarkable. Instead of being deposited in successive layers, the laminae are cast in moulds, where they harden, and acquire the exact shape of the cavities. The formation of these moulds appears to be due to an exterior, *e*, and interior, *i*, membrane, the one enveloping the other. These membranes are separated by a series of partitions, with narrow spaces between them, constituting so many compartments for the deposition of the material of each laminae. The course of these channels and their junction at the back of the matrix is seen at *s*, (fig. 3.)

After the materials for the laminae have been supplied, the next office of the bulb is to construct the stem of

the feather, and to unite the laminae to its sides. Wonderful indeed is the process by which this is effected. The bulb becomes divided into two portions, and each portion is employed in depositing the plate of horny substance which may be noticed on the front and back part of the solid end of the quill. The anterior portion of the bulb which is engaged in forming the external plate, has no sooner completed its task than it begins to elaborate the spongy substance which is to connect the two plates: meanwhile the other portion of the bulb embraces the inner plate, and gradually folds it inwards till its sides meet at the middle groove along the back of the stem. During the process of filling up the stem, the anterior part of the bulb exhibits a series of conical-shaped membranes, as seen in the section, (fig. 4.) the points of the cones being directed upwards and their intervals being occupied by the spongy substance in different stages of consolidation, and more perfect as they are situated nearer the apex of the stem.

While the construction of the feather is thus advancing below, those parts which are completely formed rise above the surface of the skin, still enveloped in their protecting capsule, but which, from the action of the air, and from the obliteration of the vessels that nourished it, now shrivels and falls off in shreds, leaving the successive portions of the feather to come forth, and the laminae to unfold and assume their proper shape. This goes on until the principal parts of the vane and stem are completed, when a different kind of action takes place. The posterior portion of the bulb now contracts itself, and brings the edges of that surface of the stem closer together, until at last they unite at the superior orifice, *o*, (fig. 1). With this its office ceases, and all that remains of its substance is a thin membrane which adheres to the outside of the barrel of the quill and must be scraped off before the latter can be used as a pen. But the anterior portion of the bulb has still an important office to perform; it now ceases to deposit the spongy substance, and forms instead a transparent horny material over the whole of its external surface; but as it retires towards the root it leaves a succession of very thin pellucid membranes in the form of cones, which, when dried, form what is termed the pith of the quill. The last remnant of the bulb is seen in the slender ligament which passes through the lower orifice, and preserves the attachment of the feather to the skin. In the process of time, this also decays, and then the feather falls off, preparatory to the formation of another. Thus at every moult, which occurs annually, or even oftener, a new cylinder is produced, and the same complicated process is again carried on which we have here attempted to describe.

It is impossible not to be struck with the admirable art and foresight displayed in the series of operations by which a feather is formed. Nor can we regard the varieties of form, or the brilliancy or delicacy of colour in these beautiful productions, without feeling bewildered at the multiplicity of operations which these imply. The remarkable form of a quill feather is thus noticed by Macculloch.

Taking any one quill feather from a wing, we see that it possesses a peculiar double curvature. How was this effected when every portion must have been formed by a separate vessel; and why was it not continued in a straight line from that quill of which it is a prolongation? It is a most delicate and difficult form to have been produced in any manner; being even more so than the cornea, or the lens of the eye; yet it is invariable, while mathematics cannot assign either of those curves. But if it is difficult to conjecture the mode of proceeding as to a single one of these feathers, what does this difficulty become, when we find that no two possess the same curvatures, in either direction, while all are double curves? The differences are of the

most evanescent and unassignable nature; while thus is the peculiar and necessary form of the wing produced. Had a mechanic planned a wing, and allotted all the portions, whether to one workman or more, we know well what the calculations must have been, and what the drawings, that every feather should thus unite to produce a single structure; as we know that no engineer can plan a far more easy machine, so that every part shall fit correctly and act truly for the first time. Yet we admire even these imperfect works, and forget to admire the Artist who planned and executed, and whose most delicate and difficult works came at once from His hand, perfect.

The example of a peacock's feather is taken by the same accomplished writer as a proof of the minuteness and complication of the vascular mechanism; for every point of every colour must have required its producing vessel, and every different colour and gradation of tint must have demanded one of different powers. The precision of place in all these must have been perfect, since there is no error of pattern, either in colouring, gradation, or drawing. "The star" formed by one feather "was commenced, or calculated, in miniature and in package in the body of the quill: it quitted this place, it advanced with the elongation of that, to a distance of three feet, enlarging in its progress, and at that distance from its obscure and unintelligible native seat, it is the accurate, the complicated, and the beautiful plane and picture that we see."

None but the unreflecting or the unbelieving can contemplate the wondrous operations we have attempted to describe without being impressed with a sense of the boundless and incomprehensible power of the Almighty Hand, which is ever executing that which to human apprehension seems impossible.

#### SPARE MINUTES.

##### MEDITATED RESOLVES AND RESOLVED MEDITATIONS.

I SEE that candle yields me small benefit at day, which at night much steads me; and I know the cause is not because the candle's light was less at day, but because the day's light is less in the evening. As my friend's love to me, so mine to my friend may be at all times alike; but we best see it, when we most need it; and that, not because our love is then greater, but our want. Though then I welcome a courtesy according to my want, yet I will value a courtesy according to its worth. That my fortunes need not my friend's courtesy is my happiness: should my happiness alight my friend's courtesy, it were my folly.

I SEE that candle makes small show in the day which at night yields a glorious lustre, not because the candle has then more light, but because the air hath then more darkness. How prejudicial then is that ambition, which makes me seem less than I am, by presuming to make me greater than I should be. They whose glory shines as the sparks amongst stubble, lose their light, if compared to the Son of glory. I will not seat myself higher than my place, lest I should be disgraced to a humility; but if I place myself lower than my seat, I may be advanced to the honour of, *Friend, sit up higher*. I had rather be exalted by my humility, than be brought low by my exaltation.

I SEE that candle which is as a sun in the darkness, is but as a darkness in the sun: the candle not more lightening the night's darkness, than the sun darkening the candle's light. I will take heed then of contention, especially with great ones. As I may be too strong for the weaker, so I must be too weak for the stronger. I cannot so easily vanquish mine inferiors, but my superiors may as easily conquer me. I will do much to be at peace with all men, but suffer much ere I contend with a mighty man.

It is the ambitious folly of too many to imitate rather greatness than goodness. They will sooner follow the example of their Lord, than the precepts of their God. I will always honour greatness, I will only imitate goodness: and rather do good without a pattern, than commit evil in imitation. 'Tis better to be saved without a precedent, than to be damned by example.

Fig. 4.





I SEE when I follow my shadow it flies me; when I fly my shadow, it follows me. I know pleasures are but shadows, which hold no longer than the sunshine of my fortunes. Lest then my pleasures should forsake me, I will forsake them. Pleasure most flies me when I most follow it.

It is not good to speak evil of all whom we know bad: it is worse to judge evil of any, who may prove good. To speak ill upon knowledge, shows a want of charity; to speak ill upon suspicion shows a want of honesty. I will not speak so bad as I know of many: I will not speak worse than I know of any. To know evil by others, and not speak it is sometimes discretion: to speak evil by others and not know it, is always dishonesty. He may be evil himself who speaks good of others upon knowledge; but he can never be good himself, who speaks evil of others upon suspicion.

A BAD great one is a great bad one: for the greatness of an evil man, makes the man's evil the greater. It is the unhappy privilege of authority, not so much to act, as teach wickedness, and by a liberal cruelty, to make the offender's sin not more his own than others. Each fault in a leader is not so much a crime as a rule for error: and their vices are made (if not warrants, yet) precedents for evil. To sin by prescription is as usual as damnable: and men run post in their journey, when they go to the devil with authority. When then the vices of the rulers of others are made the rules for vices to others, the offences of all great ones must needs be the greatest of all offences. Either then let me be great in goodness, or else it were good for me to be without greatness. My own sins are a burden too heavy for me, why then should I lade myself with other offences?

To speak all that is true, is the property of fools: to speak more than is true, is the folly of — too many. He that spends all that is his own, is an unthrifty prodigal: he that spends more than his own, is a dishonest unthrif. I may sometimes know what I will not utter, I must never utter what I do not know. I should be loth to have my tongue so large as my heart, I would scorn to have my heart less than my tongue. For if to speak all that I know shows too much folly, to speak more than I know shows too little honesty.

[ARTHUR WARWICK. 1637.]

## RURAL ECONOMY FOR THE MONTHS.

### VI.

'Tis pleasant on the steep hill side,  
Where lies in view the prospect wide,  
Of cultured farm, with interchange  
Of tilth and pasture, cot and grange,  
At ease the careless limbs to stretch  
Beneath the broad o'er-arching beech;  
And, lighted by the sky serene,  
Mark the full HAY-FIELD'S varied scene.

Here as the swarthy mowers pass,  
Slow through the tall and russet grass,  
In marshalled rank from side to side,  
With circling stroke and measured stride  
Before the scythe's wide sweeping sway,  
The russet meadow's tall array  
Falls, and the bristly surface strows  
With the brown swathe's successive rows.  
Here the blithe hamlet's gather'd throng,  
With toothed rake, and forked prong,  
Maidens and boys, in order due,  
The mowers' ridgy track pursue;  
Turn with just care the tedded hay,  
Alternate to the mellowing ray;  
Or, loosely o'er the sunny mead,  
The scattered rows promiscuous spread;  
Or what may fill the rounded lap  
In smaller heaps collected wrap;  
Or in more broad and loftier piles,  
Build the rich produce; while with smiles,  
At hand the joyous farmer eyes,  
Safe from the assault of lowering skies,  
O'er the thronged field to stature grown  
Complete the haycock's lawny cone.—MANT'S Months.

AMONG the rural occupations of the present month, that which excites the most general interest throughout the country, and which scarcely yields even to the corn-harvest in the pleasurable feelings awakened among all

classes and in all districts of our land, is the business of hay-making, to which we shall, therefore, chiefly direct our attention. For although this occupation, like all others, is dependent on the season, as to the time at which it is to be commenced, the month of June in favourable years may be reckoned the period of greatest activity, and before its close many a flowering pasture has yielded its beauties to the mower's scythe.

Hay-making is carried to great perfection in the neighbourhood of the Metropolis, where the demand is necessarily great, on account of the vast number of coach and saddle-horses, as well as cows to be supplied. Our description of hay-making is, therefore, applicable to that practised by the Middlesex farmers in general, and explained in the agricultural survey of the county. When the grass is nearly fit for mowing the farmer endeavours to select the best mowers, in number proportioned to the quantity of his grass, and the length of time it would be advisable to have it in hand, which, having done, he lots it out either as piece-work, or to be mown by the acre. In the latter way, each man mows from an acre and a half to an acre and three quarters per day, during the whole season. Five hay-makers (including loaders, pitchers, stackers, and all others) are provided to each mower. These are paid by the day, the men attending from six till six, the women from eight till six. When necessary, they work an extra hour or two in the evening, for which they receive a proportionate allowance. The mowers work from three, four, or five o'clock in the morning, till seven or eight at night, resting an hour or two in the middle of the day. The operations of the first day are as follows:—

All the grass mown before nine in the morning is tedded, in which great care is taken thoroughly to loosen every lump, and to strew it evenly all over the ground. By this regular method of tedding grass for hay, the hay will be of a more valuable quality, will heat more equally in the stock, and will consequently not be so liable to damage or fire; it will also be of much greater quantity when cut into trusses, and will sell at a better price, for when the grass is suffered to lie a day or two, before it is tedded out of the swath, the upper surface is dried by the sun and winds, and the interior part is not dried, but withered, so that the herbs lose much in quality as well as quantity. Soon after the tedding is finished the hay is turned with the same degree of care and attention, and if, from the number of hands, they are able to turn the whole again they do so, or at least as much of it as they can till twelve or one o'clock, at which time they dine. The first thing to be done dinner is to rake it into what are called single wind-rows; and the last operation of this day is to put it into grass-cocks.

The business of the second day commences with tedding all the grass that was mown the first day after nine o'clock, and all that was mown this day before nine o'clock. Next, the grass-cocks are well shaken out into *staddles*, or separate plots, the spaces between these plots being raked clean, and the rakings mixed with the other hay, that all may dry of a uniform colour. The next business is to turn the staddles, and then the grass that was tedded the first part of the morning once or twice, as described for the first day. This should be done before twelve or one o'clock, so that the whole may lie to dry while the work-people are at dinner. After dinner the first thing to be done is to rake the staddles into double wind-rows; next to rake the grass into single wind-rows; then the double wind-rows are put into bastard-cocks; and the wind-rows into grass-cocks.

On the third day the grass mown and not spread into cocks on the second day, and also that mown on the early part of this day, is first tedded in the morning, and then the grass-cocks are spread into staddles as before, and the bastard-cocks into staddles of less extent. These smaller staddles, though last spread, are first turned, then

those which were in the grass-cocks, and next the grass is turned once or twice before twelve or one o'clock. If the weather has proved sunny the hay which was last night made into bastard-cocks, will on the afternoon of this day be in a fit state to be carried, but if the weather should on the contrary have been cool and cloudy, no part of it probably will be fit to carry. When this is the case, some of the processes above described must be repeated during the afternoon, and the morning of the fourth day will probably be the proper time to carry the more advanced part of hay, while the remainder will continue to require the same treatment as before. Thus field after field is rapidly cleared during propitious weather; while, if the season be rainy and unfavourable, the farmer has frequent trials of his patience, and is doomed to meet with many disappointments. Yet, with all his trials, he is far better off in the hay-making season than many of the Hebridean or the Swedish farmers, who cannot get their crop of hay together without suspending it on poles, trees, or rods to dry.

It is not unfrequent in the county of Middlesex to see large hay-barns constructed of timber, and open to the south and east, or even on all sides. Some of these are capable of holding from thirty to fifty or even a hundred loads of hay. They are chiefly useful during a catching and unsettled hay-harvest, and also to afford opportunities of cutting, binding, and weighing hay in wet or windy weather, when these operations could not be performed in the field. The expense of erecting these barns is considerable, and if, as some agriculturists affirm, the hay is more apt to heat in them than when exposed to the air, they are to be regarded as of very questionable utility.

The general rules to be observed in hay-making are self-evident to those who are at all acquainted with rural affairs. It is highly necessary that the grass should be protected as much as possible day and night from rain and dew by cocking. Care must also be taken not to have more grass in hand at any one time than can be managed according to the foregoing process. This may be accomplished by duly proportioning the number of hay-makers to mowers. In showery weather the grass may sometimes be suffered to lie three, four, or even five days in swath. But before it has lain long enough for the under side of the swath to become yellow, particular care should be taken to turn the swaths with the heads of the rakes. In this state it will cure so much in about two days as only to require being tedded a few hours when the weather is fine, previously to its being put together and carried. Hay may thus be made and carried at a small expense, and of a moderately good colour, but the tops and bottoms of the grass are insufficiently separated by it.

The hay-tedding machine is much used near London, and also in extensive parks, &c., in various parts of the country. Its value in the neighbourhood of the Metropolis is enhanced by the high price of manual labour, and the scarcity of hands sometimes experienced. This useful implement is especially adapted for making natural or meadow-hay, which requires to be much more frequently turned and more thinly spread out than hay, clover, and rye grass. It consists of an axle and a pair of wheels, the axle forming the shaft of an open cylindrical frame, formed by arms proceeding from it, from the extremity of which bars are stretched, set with iron prongs, pointing outwards, and about six inches long, and curved. There is a crank by which this cylinder of prongs is raised from the ground when the machine is going to and returning from the field, or when it is not wanted to operate. It is drawn by one horse, and is found to answer perfectly well as a tedding machine. It is computed that a boy and horse with the machine will ted as much in an hour as twelve or fifteen women. It is painful, however, to the feelings of those who love the picturesque appearance of our fields in hay-making

time, to see a machine in action, twirling about the flying grass, and superseding the labours of the ruddy country lasses in their motley garments, and the sun-burnt youths that were wont to accompany them.

In Derbyshire, and in the North Riding of Yorkshire, the practice of salting the hay at the time of stacking is very general. The salt checks fermentation, and prevents the hay from becoming mouldy, and cattle eat it with avidity. Sometimes a little straw is mixed with the hay, for the sake of imbibing moisture and still further checking fermentation. This sort of hay, if salted, is eaten with more avidity, though mixed with straw, than hay of a better quality that is not salted. Cattle will also thrive well upon it. The quantity recommended is a peck of salt to a ton of hay.

Our notice of hay-making leaves us little space to dwell on the other operations of the month, which are the ploughing and cleansing of fallows intended for wheat; sowing the main crops of Swedish and other turnips; and in many parts of our island, the shearing of sheep. This latter operation is sometimes performed in May, and if the weather continue mild and warm, the sheep will thrive all the better without the incumbrance of their heavy load of wool. But should the cold weather return, as it frequently does, at a very late period of the spring, more particularly in the northern parts of the kingdom, it were far better that the fleeces had not been removed.

The present is the latest period for weeding and destroying the noxious productions of the soil, and much vigilance is required to do this effectually; indeed, so prone are some soils to particular sorts of weeds that it is a task of much difficulty to clear them well. The most careful agriculturist is also frequently annoyed by finding that he has introduced a variety of weeds into his crop along with the manure which he has found it necessary to procure from a distance. Lands overrun with couch grass, and other root-weeds of the same class, by being laid down to grass for half-a-dozen years will be found in most cases completely freed from them. A hard and dry soil is more favourable for the destruction of root-weeds than one of a contrary description. Some of the most pernicious weeds are darnel, coltsfoot, and charlock. These, with the numerous tribes common on farms, must, in order to be removed at all, be got rid of while they are young.

SIR THOMAS ROE took out some English mastiffs to India, as a present for the Great Mogul: they were of marvellous courage. One of them leaped overboard to attack a shoal of porpoises, and was lost. Only two of them lived to reach India. They travelled each in a little coach to Agra: one broke loose by the way, fell upon a large elephant, and fastened on his trunk: the elephant at last succeeded in hurling him off. This story delighted the Mogul, and these dogs in consequence came to as extraordinary a fortune as Whittington's cat. Each had a palanquin to take the air in, with two attendants to bear him, and two more to walk on each side and fan off the flies: and the Mogul had a pair of silver tongs made, that he might when he pleased feed them with his own hand.

There was a Newfoundland dog on board the *Bellona*, who kept the deck during the battle of Copenhagen, running backward and forward with so brave an anger, that he became a greater favourite with the men than ever. When the ship was paid off after the peace of Amiens, the sailors had a parting dinner on shore. Victor was placed in the chair, and fed with roast beef and plum-pudding, and the bill was made out in Victor's name.—SOUTHEY'S *Omniana*.

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